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| 10/815,893      | 03/31/2004  | Joseph Daniel Tobiason | MEIP122171          | 9092             |

26389 7590 03/02/2007  
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| EXAMINER |
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TON, TRI T

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| ART UNIT | PAPER NUMBER |
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2877

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE  | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS                               | 03/02/2007 | PAPER         |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/815,893 | <b>Applicant(s)</b><br>TOBIASON ET AL. |  |
|                              | <b>Examiner</b><br>Tri T. Ton        | <b>Art Unit</b><br>2877                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-10 and 13-17 is/are rejected.
- 7) ☒ Claim(s) 3-5, 11 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's response to amendment filed on 01/02/2007 has been entered.

### *Double Patenting*

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1-2, 6-10, 13-17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6 and 14 of Tobiason et al. (U.S. Patent No. 7,075,097). Hereafter, "Tobiason '097"

Although the conflicting claims are not identical, they are not patentably distinct from each other because anticipates the claimed invention as followed:

As to claim 1, Tobiason '097 teaches an imaging array detector (claim 1, line 4), and a structured light generating target member comprising at least three respective target sources that output at least three respective structured light patterns, the output structured light patterns being in a fixed relationship relative to the target member (claim 3, lines 2-4), (structured light patterns in the application are target features in the reference, they both do the same function), wherein: the imaging array detector and the structured light generating target member are positionable to provide a structured light image on the imaging array detector (claim 1, lines 20-22) each of the at least three respective target sources gives rise to a corresponding respective image feature in the image on the imaging array detector (claim 2, lines 4-6); and a size characteristic of each of the at least three corresponding respective image features in the image is usable to determine a z-coordinate value for a respective reference point that is fixed relative to the corresponding respective target source, the z-coordinate value corresponding to a translational degree of freedom along a z-axis that extending along a direction of varying separation between the imaging array detector and the target member (claim 4, lines 5-10), (claim 5, lines 10-14).

As to claim 2 Tobiason '097 teaches the locations of a plurality of the corresponding respective image features in the image being usable in conjunction with their respective size characteristics to determine (x,y,z) coordinate values for the corresponding respective target sources, wherein the x-coordinate value and the y-coordinate value corresponding to two translational degrees of freedom in a plane that is perpendicular to the z-axis (claim 4, lines 1-10).

As to claim 6 Tobiason '097 teaches the structured light generating target member comprising a two-dimensional array of respective target sources that output respective structured light patterns (claim 14, lines 2-6), and the two-dimensional array of respective target sources is periodic along each of two directions (claim 15).

As to claim 7 Tobiason '097 teaches a plurality of the respective target sources being configured such that each of their respective image features comprise at least one of a ring-shaped pattern that is continuous in the image and a ring-shaped pattern that consists of a group of discrete light spots in the image (claim 4 and claim 6).

As to claim 8, Tobiason '097 teaches the ring-shaped pattern being an elliptical pattern when a plane of the target member is not parallel to a plane of the imaging array detector (claim 6, lines 1-3).

As to claim 9, Tobiason '097 teaches the plurality of the respective target sources being configured such that the dimension of each ellipse-shaped pattern across its minor axis is linearly related to the z-coordinate value corresponding to the respective target source that gives rise to the ellipse in the image (claim 6, lines 6-20).

As to claim 10 Tobiason '097 teaches a plurality of respective target sources each comprising an optical element that has an optical axis, and that inputs collimated light from a

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light source parallel to its optical axis, and outputs a respective structured light pattern (claim 1, lines 5-13).

As to claim 13 Tobiason '097 teaches providing an imaging detector (claim 1, line 4), providing a structured light generating target member comprising at least three respective target sources that output at least three respective structured light patterns, the output structured light patterns being in a fixed relationship relative to the target member (claim 3, lines 2-4), (structured light patterns in the application are target features in the reference, they both do the same function); positioning the imaging array detector and the structured light generating target member to provide a structured light image on the imaging array detector (claim 1, lines 20-22), providing an image on the imaging array detector, wherein each of the at least three respective target sources gives rise to a corresponding respective image feature in the image (claim 2, lines 4-6); and for each of the at least three corresponding respective image features in the image, determining a size characteristic of that respective image feature and using the size characteristic to determine a z-coordinate value for a respective reference point that is fixed relative to the corresponding respective target source, each z-coordinate value corresponding to a translational degree of freedom along a z-axis that extends along a direction of varying separation between the imaging array detector and the target member (claim 4, lines 5-10), (claim 5, lines 10-14).

As to claim 14 Tobiason '097 teaches determining the locations of a plurality of the corresponding respective image features in the image; and using the determined locations of the plurality of the corresponding respective image features in the image, in conjunction with their

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respective size characteristic, to determine (x,y,z) coordinate values for the corresponding respective target sources, wherein the x-coordinate value and the y-coordinate value correspond to two translational degrees of freedom in a plane that is perpendicular to the z-axis (claim 4, lines 1-10).

As to claim 15 Tobiason '097 teaches determining a six degree of freedom relative position between the imaging detector and the target member based on the determined (x,y,z) coordinate values (claim 3, lines 5-13).

As to claim 16 Tobiason '097 teaches a plurality of respective target sources being each configured such that they each give rise to a corresponding respective image feature comprising a respective elliptical pattern in the image when a plane of the target member is not parallel to a plane of the imaging array detector (claim 2, lines 4-6), (claim 6, lines 1-3); determining a size characteristic and location of a respective image feature in the image comprises fitting respective ellipses to its respective elliptical patterns (claim 5, lines 2-5); and the determined respective size characteristics comprise the dimensions of the major and minor axes of the respective ellipses fit to respective elliptical patterns, and the determined respective locations comprise the center of the respective ellipses fit to respective elliptical patterns (claim 4), (ring shaped image being included elliptical image).

As to claim 17 Tobiason '097 teaches each respective elliptical pattern in the image exhibits a set of radial intensity profiles, each radial intensity profile comprising the intensity

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values of a set of image pixels of the elliptical pattern lying along one corresponding radial direction extending from a nominal center of the respective elliptical pattern, and fitting a respective ellipses to its respective elliptical pattern (claim 6, lines 1-8) comprises: determining the location of a radial intensity profile peak for each member of the set of radial intensity profiles corresponding to a respective elliptical pattern; and fitting a respective ellipse to the determined locations of the radial intensity profile peaks corresponding to that respective elliptical pattern (claim 6, lines 8-20).

***Allowable Subject Matter***

4. Claims 3-5 and 11-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: No prior art found by the examiner that suggested modification or combination with the cited art so as to satisfy the combination of all the limitations in claims 3 and 11.

6. As to claim 3, the prior art of record taken along or in combination, fails to disclose or render obvious "... determine the respective size characteristics and locations of the plurality of the corresponding respective image features in the image, determine the (x,y,z) coordinate values for the corresponding respective target sources; and determine a six degree of freedom relative position between the imaging detector and the target member based on the determined (x,y,z) coordinate values." in combination with the rest of the limitations of claims 1, 2 and 3.



7. As to claim 11, the prior art of record taken along or in combination, fails to disclose or render obvious “... rays distributed in a pattern that nominally coincides with at least of part of a conical surface of revolution, the structured light pattern having a cross-section that forms a ring-shaped pattern in a plane perpendicular to the optical axis, and wherein the rays each form approximately the same cone angle relative the optical axis.” in combination with the rest of the limitations of claims 1, 7, 8, 10 and 11.

***Response to Arguments***

8. Applicant's arguments filed on 01/02/07, with respect to the rejection(s) of claim 1 under 102(e) have been fully considered but are not persuasive.

9. With respect to applicant's remarks regarding rejected claim 1, claim 1 has been amended to interpret in the light of the specification. Applicant also added new claims 2-17. Claims 1, 2, 6-10, 13-17, are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-6 and 14 of Tobiason et al. (U.S. Patent No. 7,075,097).

***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The reference of Tobiasson et al. (U.S. Patent No. 7,075,097) teaches of various features similar to the claimed invention.

***Fax/Telephone Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tri T. Ton whose telephone number is (571) 272-9064. The examiner can normally be reached on 10:30am - 7:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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A handwritten signature in black ink, appearing to read 'Tri Ton', with a horizontal line drawn underneath it.

February 14, 2006  
Examiner Tri Ton/SN

A handwritten signature in black ink, appearing to read 'Hoa Pham', with a horizontal line drawn underneath it.

Hoa Pham  
Primary Patent Examiner  
Art Unit 2877  
Technology Center 2800